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Giving up cars – the impact of a mobility experiment on carbon emissions and everyday routines

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Abstract

Despite recent political and scientific interest in experiments, there is little research on participants' experiences of experimentation. This article focuses on an experiment during which eleven participants gave up ownership of their cars, and in return, received free travel cards to local buses for six months. The experiment is analysed from two perspectives. Firstly, the impact of the experiment on carbon emissions of the participants' everyday mobility is estimated based on weekly mobility surveillances and travel card data. Secondly, the practice theoretical approach is used to study the change in participants' mobility routines. The results indicate that the processes of de- and re-routinisation depend on multiple structural and individual factors reinforcing each other. Although carbon emissions of everyday mobility were reduced because of the experiment, there was variation in how the new routines were (or were not) acquired among the participants. The article suggests that, when analysed from the practice perspective, experiments might work as tools for mutual learning on how to make local public transportation more attractive among residents. Attention should also be paid to reducing the need for driving in the first place, as well as to providing more support and services for car-free living.

Key words

Mobility; experiments; carbon emissions; de- and re-routinisation; practice theory

1 Introduction

Mobility[1] plays an important role in the transition towards sustainability: not only does it account for 20% of carbon emissions in Europe, other negative consequences include local air pollution, noise, accidents, increasing congestion and land use, and social exclusion (e.g., Banister, 2008; Brög et al., 2004). Despite these widely recognised detrimental impacts on sustainability, the dominance of cars has not diminished; on the contrary, transport is the only major sector in the EU where greenhouse gas (GHG) emissions are still rising (Thomas, 2015).

Countries and cities globally have pursued strategies for sustainable transport[2]. However, the discussion on sustainability transition in mobility has focused predominantly on technological developments and encouraging changes in behaviours and choices of individuals, while overlooking the embeddedness of mobility in our daily, and social, life (Schwanen et al., 2011; Sheller and Urry, 2000; Watson, 2012). However, as Nijhuis (2013: 219) describes, "mobility forms the cement without which other social practices would only be loose bricks." Consequently, research has recently shifted to emphasise the importance of understanding the broader contexts in which travel choices are made and mobility practices performed (Cairns et al., 2014; Shove et al., 2015).

Experiments are considered an innovative way and 'safe spaces' for people to 'trial behaviour' and for local policy to gain new knowledge and find alternatives to status quo (Laakso and Lettenmeier, 2016; Sengers et al., 2016; Strömberg et al., 2016). The appeal of experimentation is that new ways of doing could eventually diffuse into the mainstream. Reviews of interventions promoting public transport (PT), for instance, have nevertheless showed that the effects of experimentation often remain temporary, and people involved in interventions tend to return to their old habits (e.g., Redman et al., 2013).

For experiments to promote local sustainability and to gain understanding of the adoption of new practices (and discarding of old ones) due to experimentation, the experiences of participants are important. Relevant questions include: how participating in an experiment affects participants' routines and everyday living, what effect these experiences have on the success (or failure) of

[1] Mobility is understood here as more or less regular and frequent physical moving, such as daily routine travel to and from work (c.f., Banister, 2008).
[2] Sustainable transport is defined here as transport not endangering public health or ecosystem services (c.f., Nygrén et al., 2012).

experiments, and how could future experiments – and local policy in general – take these experiences into account?

In answer to these questions, this article presents the results of a study of an experiment called 'Give up your car'. In this experiment, eleven participants gave up ownership of (one of) their cars and, in return, received free travel cards for local buses valid for six months. This article approaches this experiment from two perspectives. Firstly, from the perspective of environmental sustainability, by analysing the reduction in GHG emissions of participants' everyday mobility. Secondly, from the perspective of de- and re-routinisation of mobility practices due to the experiment, based on extensive reporting of the participants on their everyday mobility.

The article proceeds as follows: Section 2 introduces the theoretical background, and Section 3 discusses the context, materials, and methods of the study. The results in Section 4 are divided to environmental impacts and everyday practices. The results are discussed in Section 5, and Section 6 is the concluding section of the article.

2 Framework of the study: practice theoretical approach to studying experiments

2.1 Mobility as a practice

A variety of studies analyse driving as a behaviour, driven by attitudes, personal norms, and lifestyles (c.f., Abrahamse et al., 2009; Cairns et al., 2014). Traditional travel behaviour theories (reviewed by e.g., Gärling and Fujii, 2009) have attracted criticism because they assume behaviour to be deliberate and largely detached from social and structural contexts (Barr and Prillwitz, 2014; Heisserer, 2014). In the practice theory, practices are seen as the central social phenomena, by which other social entities, such as actions, institutions and structures, are understood (Reckwitz, 2002; Schatzki, 2002; Shove et al., 2012; Warde, 2005). Practice theory is widely used to understand the dynamics of everyday mobility and to explore ways of moving beyond automobility (Birtchnell, 2012; Watson, 2012), covering areas such as commuting (Heisserer, 2014), leisure travelling (Hui, 2013), food shopping (Mattioli and Anable, 2017), car sharing (Kent and Dowling, 2013), electric car driving (Ryghaug and Toftaker, 2014), and passengering (Laurier et al., 2008).

Mobility can be understood as a complex of interconnected practices (like driving and commuting) that intersect with other daily practices (such as housing and shopping), in the context of socio-technical systems, institutions, and modes of spatial and temporal organization (Aro, 2016; Shove et al., 2015, 2012; Warde, 2005). Practices are connected to each other by shared, recognisable and describable elements: material objects, understandings and competences, and objectives and meanings (c.f., Gram-Hanssen, 2010). Practice theory avoids methodological individualism, and thus enables empirical analysis of the complexities of a phenomenon such as mobility. This is possible by turning attention to technologies and infrastructures, shared rules and understandings of normality, as well as social and personal norms that constitute practices (Halkier and Jensen, 2011; Higham et al., 2013).

Practices are reproduced through recurrent, non-reflexive and shared actions and conventions: in other words, routines. Routines are "observable performances of stable practices" (Southerton, 2013: 337) that make people meet the standards they think of as normal and common (Aro, 2016; Shove, 2003). These so-called faithful performances need to change for patterns of everyday living to shift in more sustainable directions (Evans et al., 2012; Southerton, 2013). An interesting issue lies in the dynamics between the stability and elasticity of practices (Hargreaves, 2011; Southerton, 2013). On the one hand, practices can become entrenched (Røpke, 2009). On the other hand, people continuously change their routines throughout their lives, and there are individual differences in performances of practices (Gram-Hanssen, 2008; Nijhuis, 2013).

2.2 Experimenting sustainable mobility

In recent years, a lot of political and scientific attention has been paid to experiments (Berg, 2013; Evans, 2011). Testing out technologies and policies under real world conditions can prompt new ways of learning, and eventually complement or change local (and national) policy (Castán Broto and Bulkeley, 2013; de Bruijne et al., 2010). According to Berg (2013), conducting an experiment means making something new and concrete that is restricted in terms of time, space, scope or actors, and has the potential to have a wider societal relevance. Another important characteristic of experiments is that there must be a possibility of failure (Karvonen and van Heur, 2014).

Although many dimensions of mobility regimes, like traffic regulations and mobility culture, are national or wider, some, such as urban planning, are local (Geels, 2012; Urry, 2004). Mobility

experimentation has included introducing new technologies, such as electric vehicles and car-pooling platforms (Brown et al., 2003; Sengers, 2016). Even if these are relevant alternatives to gasoline-fuelled cars, PT still plays a key role especially in urban mobility, with competitive uses for space dominated by cars. Breaking the habit of car use requires a 'trigger moment' (Nijhuis, 2013) or a 'discontinuity' (Verplanken et al., 2008), such as an opportunity for a free trial. These kinds of interventions have indeed succeeded in attracting car users to test PT (Redman et al., 2013). Spaargaren (1997) calls this moment *de-routinisation,* a point where an individual is able to examine the routine nature of one's behaviour from a specific perspective. This may lead to a trial period, during which new ways of conducting the practices of everyday life are tested.

The challenge is to obtain *re-routinisation.* This involves the restructuring of new, more or less stable routines, as actors are drawn into, and defined by, the practice in which they engage. Over time, they become committed to this practice, such as a new means of mobility (Ryghaug and Toftaker, 2014; Shove et al., 2012). Experiments can provide a 'window of opportunity' for this process to materialise (Nijhuis, 2013: 154-155). However, a thorough review of Arnott et al. (2014) on 27 behavioural interventions, suggests that there is no evidence on the efficacy of interventions in decreasing the frequency of car use. The finding is supported by a review of 77 behavioural interventions by Graham-Rowe et al. (2011), as well as Redman's et al. (2013) review on 74 studies of PT improvements. Results indicate that interventions, such as free travel cards, encourage bus use in the short term, but the effects are not maintained when the incentives are removed. For example Fujii and Kitamura (2003) and Thøgersen (2009; Thøgersen and Møller, 2008) conducted studies on the impact of free travel card on altogether 396 car users in Kyoto and Copenhagen. In both cases, the intervention succeeded in attracting car users to use PT, but post-intervention, the participants did not use PT more than control subjects (Thøgersen, 2009). Hindrances to using PT are related to, for instance, an access to a car as well as the underlying motivations for using private vehicles (Redman et al., 2013).

As routines are not solely individual features, but performances of social practices, it is important to understand how different inter- and path dependencies affect these performances, and to reconfigure these connections to reduce the environmental impacts of everyday life. Practices may transform due to changes in the elements constituting them, changes in the configurations or connections of practices, or due to patterns of recruitment and defection of actors involved in performing practices (Shove et al., 2012; Watson, 2012). For the transformation needed, change may be required by all sources, and in all elements of a practice (Shove and Walker, 2010; Southerton, 2013). From the

perspective of practice theory, most transport policy has, however, focused mainly on materials (e.g., vehicles) or competences (e.g., education). Meanings and feelings, as well as the inter- and path dependencies of mobility practices, have received less attention (Aro, 2016; Cairns et al., 2014; Kent, 2015).

3 Materials and methods

In Finland, policy has to counter the trends in declining rates of walking and cycling in everyday mobility, and the rising number of households owning two cars (Finnish national passenger transport survey, 2012). In Jyväskylä[3], only 5% of all trips are done by PT, compared with 60% by car (Kalenoja, 2010). The City of Jyväskylä has tried to increase the share of PT in everyday mobility by different means, such as providing free trial days and creating an educational model for sustainable transport for school children. The experiment 'Give up your car' was targeted at two-car households interested in replacing their driving by using buses. The aim was to encourage the use of PT and to lower carbon emissions, as well as to test whether projects like this could be useful in promoting PT in the future. Local media and the website of the local PT authority that organised the experiment advertised the call for participants. The participants were chosen from 22 applicants by the local PT authority. One condition of participation was that the participants sold (one of) their cars: they had to present a transfer certificate before the experiment started. The City of Jyväskylä offered the participants free travel cards (1-2 per household) for local buses in return. Further support (such as guidance on alternative modes of mobility) were not provided. The experiment started in January 2015 and ended six months later.

Altogether eleven households of different sizes participated in the experiment (Table 1). Four of them gave up their only cars. Seven households owned two cars and gave up one of them. The condition of participation, as well as the six-month duration, separates the experiment from previous free travel card interventions (e.g., Fujii and Kitamura, 2003; Thøgersen, 2009). Additionally, the number of participants was small compared to previous studies. This was due to the tentative role and length of the experiment, as well as the intense reporting required from the participants. The detailed reporting was necessary to gain in-depth understanding of 'how and why people do what they do' (Shove and Walker, 2010), and to nourish higher-order learning from the experiment (de Bruijne et al., 2010).

[3] With 137,000 residents, Jyväskylä is the seventh largest city in Finland. The city is one of the fastest growing cities in Finland.

Table 1. Description of the participating households[4].

Participant		**Daily mobility (by car, unless other mentioned)**
One-car households		
Anne	Single parent whose son recently got his driver's licence, so she decided to sell her car.	4 km to work and 2 km to grocery shop, another shop next to Anne's workplace.
Niina	Young woman who had just moved to Jyväskylä to work, and decided to sell her car.	6.5 km to work, 2.5 km to nearest shop.
Ida	Single parent who works in Jyväskylä. Older child is school-aged and the other is at day-care. Divorced recently and gave up the family's only car in the process.	10 km to work, 2 km to day-care, 4 km to school (by bus). 1.5 km to grocery shop. Less than 1 km walk to hobbies, more than 5 km to friends' homes.
Henri	Elderly couple. They had to give up their old car and decided not to buy a new one.	1 km to shops, 2.5-7 km to leisure time activities, 8 km to city centre.
Two-car households		
Eeva	Elderly couple. Eeva retired recently and decided to sell her car.	2 km to nearest shop and 5 km to mutual leisure time activities.
Laura	Elderly couple. Laura is retired but does some occasional jobs. She also takes care of her parents who still live home and thus they need a car, but decided to give up the other.	3 km to nearest shop, 10 km to rest home and to Laura's mothers home.
Ilja	Family working in Jyväskylä area, teenage child goes to upper secondary school. Ilja sold his car as it is not much used.	8 km to Ilja's work (bus/ bicycle), 9 km to wife's work, 9 km to school (by bus). 1 km to shop, 7 km to child's sport activities.
Jenni	Family with small children. They moved to a new neighbourhood with all services nearby, so they decided to test living with one car.	8 km to workplaces of parents, 0.5 km to the shop. Husband's working hours prevent him from using a bus.
Kati	Family with four children. Father works outside Jyväskylä. Two older children are school-aged. They planned to buy another car, but decided to test living with one car only.	40 km to father's work, 4 km to mother's work, 5 km to day-care, 3.5 to school (by bus), 5 km to hobbies, 3.5-4 to shops.
Mari	Middle-aged couple. Mari is recently unemployed and decided to sell her car, and her husband works outside Jyväskylä.	40 km to work by car, 0.5 km to nearest shop and 13 to city centre.
Henna	Middle-aged couple. Henna is recently unemployed and decided to sell her car, and her husband works outside Jyväskylä	55 km to work, 2 km to nearest shop, 6 km to city centre.

[4] All participants have been given pseudonyms in order to preserve their anonymity.

One person was mainly responsible for reporting in each household. Before the experiment started, each participating household was asked to describe their everyday mobility prior to the experiment. During the experiment, participants wrote about their experiences three times. After the experiment had ended, participants replied to some additional questions regarding their experiences, and stated whether they were going to continue using PT and why (or why not). A follow-up questionnaire was sent six months later, and participants were asked how their everyday mobility had changed after the experiment[5]. Each participant also conducted one-week mobility surveillance three times during the experiment. This surveillance included the time, destination, and participants of, reason for, and kilometres travelled during each trip. In addition, the local PT authority provided data on the participants' use of travel cards during the experiment.

GHG emissions of mobility were calculated based on weekly mobility surveillance, complemented by the data from travel card reports[6]. The calculations were done using the GHG emission coefficients of Nissinen et al. (2013). The analysis of written material was supported by data from mobility surveillance and travel cards. The five categories of mobility practices (c.f., Nijhuis, 2013: 140) comprised the basis of analysis: commuting and business travel, school and day-care travel, visiting family and friends, (grocery and recreational) shopping, and leisure (and non-daily) travel. The analysis focused on the processes of de- and re-routinisation, and on how inter- and path dependencies of practices affect these processes.

4 Results

4.1 Effect of the experiment on GHG emissions of everyday mobility

Before the experiment, the household members drove 210 kilometres (per person per week) on average, varying between 35 to 850 kilometres. Differences between the participants were due to distances to work, shops and other services, the need to use the car during workdays or for other errands, and leisure time activities of household members. Almost all households had owned as many cars as there were adults, and having an own car had made the chaining of trips unnecessary:

[5] Two out of eleven participants did not reply to a follow-up questionnaire.
[6] Some trips, such as trips to summer houses, were not included in calculations as these trips were not interpreted as daily mobility. In June, school-aged children were already on a summer holiday, so their daily school trips were added to calculations for comparability with previous surveillance weeks. Three participants did not return the last mobility surveillance, so the results from the previous surveillance, complemented with travel card data, were used.

participants mostly drove to work and back home, then to grocery shop and leisure time activities separately. Only the school-aged children and Ilja had used buses. Most participants drove two to three times a week to hypermarkets or the city centre for grocery (and recreational) shopping. Parents took their children to day-care before heading to work, and sometimes they also gave rides to school-aged children although they could easily cycle or use the bus.

At the end of the experiment, the average kilometres driven had been reduced to 100 (per person per week). The total GHG emissions of participants reduced significantly during the experiment (as all the households had one car less), the average reduction being 43 % (Figure 1). The reduction varied between 8 to 69% among households, although in one household (Eeva), the emissions actually increased slightly during the spring. Of the four participants who sold their only cars, three did not drive at all during the last surveillance week – only Henri and his wife had borrowed a car to get to their summer house. The participants who still had one car used it more efficiently.

Driving was replaced by using buses at the beginning of the experiment, and by walking and cycling towards the spring. Also, the use of taxis and borrowed cars slightly increased during the spring, but other alternatives (such as rental cars) were not used. Eight participants increased their bus use (except Ilja, whose bus use did not change much) during the experiment, and were using buses regularly throughout the experiment. Only Eeva, Laura, and Mari hardly used buses at all. Most participants also started to walk and cycle more, as many destinations were within a walking distance (c.f., Table 1). Eeva, for instance, replaced using her own car by walking and borrowing her husband's car when necessary.

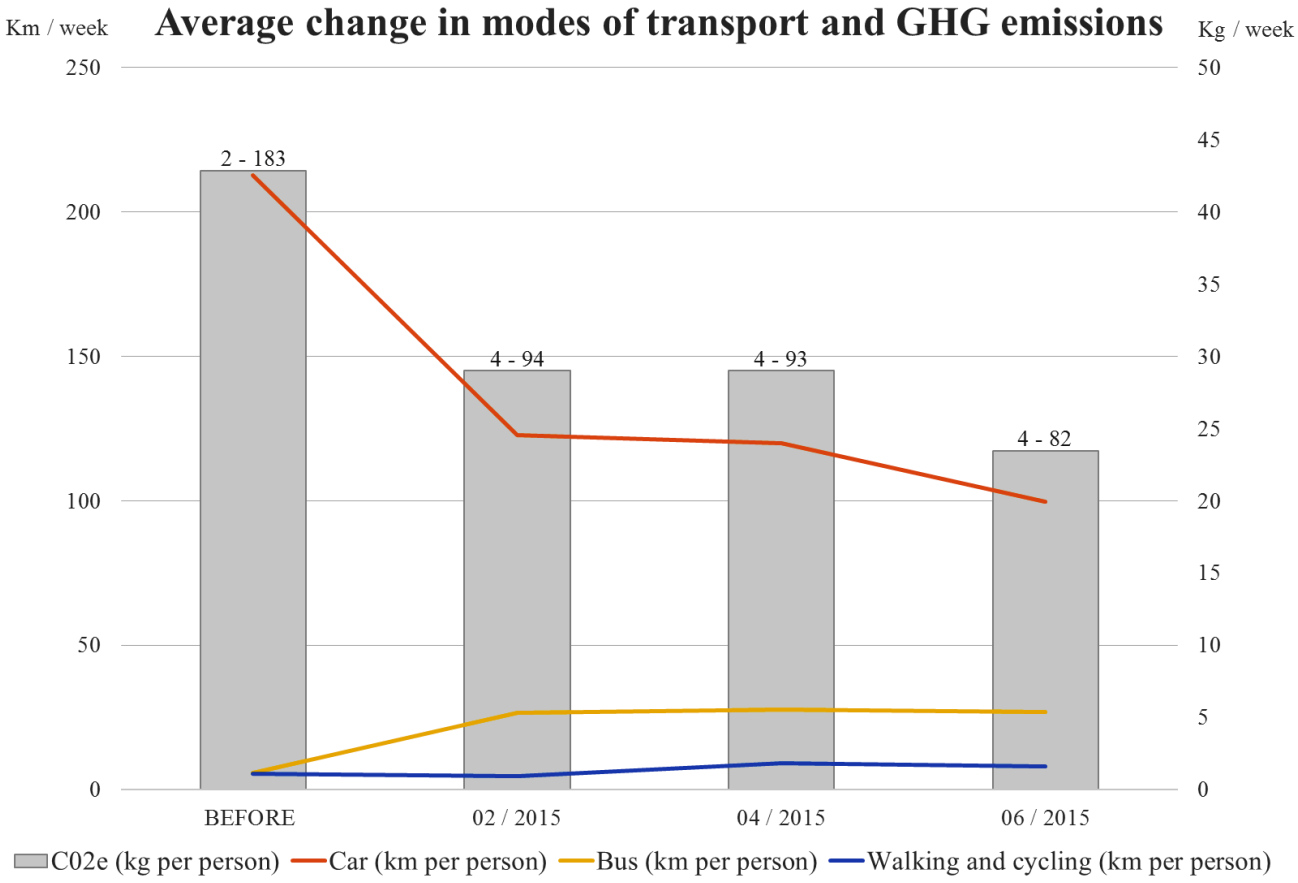

Figure 1. Changes in different transport modes (kilometres per person per week) and in GHG emissions (kilograms of CO_2e per person per week) during the experiment. The range of GHG emissions is presented at the top of each bar. The first point (BEFORE) refers to time before giving up the cars.

Six months after the experiment, only one of the participants (Ida) had bought a new car due to moving house. Other participants who gave up their only car continued using buses regularly, but most other participants reduced their bus use after the experiment. This indicates that the emissions increased at least slightly after the experiment, as bus use was replaced by even more intensive use of the remaining car.

4.2 Effect of the experiment on everyday routines of mobility

Many of the participants had considered giving up ownership of their cars already before the experiment, and seeing the announcement in local newspaper was the incentive they needed to make

the final decision. The process of de-routinisation had thus already begun for many participants, due to moving house, unemployment or retirement, and it was the perfect timing for them to participate in the experiment. The longer the participants had been thinking about and mentally preparing for giving up car ownership, the easier the actual shift was.

Simply put, re-routinisation in mobility can be divided into three alternative processes: easy, manageable and hard. The processes varied, depending on other practices of working, parenting, taking care of oneself or of others, shopping and spending spare time, as well as on the complex interdependencies between the practices. There were thus different paths of re-routinisation – also within the households – for commuting and business travel, school and day-care travel, visiting family and friends, shopping and leisure travel, reflecting the whole organisation of everyday life. Processes also varied depending on the practice in question: changing commuting practices was mainly easy, whereas changing practices of shopping or visiting friends was more laborious.

Some of the participants felt that their everyday living *did not change much* due to bus use: they either had already used buses, or using the bus replaced driving effortlessly. As Ilja described, "participating in the experiment confirmed the choices already made." The shift from a car to a bus was simple due to direct bus routes between home and work, easy access to bus stops and compatible working hours. Other practices supported the change in mobility: participants did not have leisure time activities for which a car was mandatory, nor did they have to use a car for business travel, or they could use their workplace's cars.

In many households, however, mobility practices diverged due to the experiment: those who had sold or given up their cars became car-free, whereas the other adult continued driving as usual, despite the opportunity to test the bus use. This was mostly justified by long distances or lack of proper bus connections to work, or the need to use the car during the work days. Nevertheless, none of the participants reported household negotiations on the use of the remaining car, demonstrating the role of cars as very personal objects. On the contrary, shared trips were still mostly done by car. Also the maintenance of the car was left to the car-driving adult, who also took a greater responsibility for shopping and running other errands, or adjusting schedules or routes in a way that the car-free partner could also join the trips.

Some participants had to gain new skills and competences, and change their ways of thinking, to *commit to the new practices*. Many of them had only used cars in their everyday mobility for decades.

Using a bus got easier during the experiment, as these participants got used to checking the schedules, using the travel card, and moving in a mobile bus. They became familiar with the bus routes, and learned to spend time in the bus by checking news and e-mails, or chatting with other passengers. As bus use became more convenient, feelings towards their past car use also changed, fortifying the positive experience of successfully performing the new practice: "It is easier -- you are certainly at work on time, and you don't need to panic about finding a parking space" (Anne).

Almost all participants had to restructure their shopping practices. Some of them went shopping less frequently, so that they could buy everything they needed at once when the car was available. Others, on the contrary, started to do shopping more often, to be able to buy less at a time and carry the groceries without a car. They had purchased new means of conveyance for shopping trips: "We bought bicycle pannier bags and a wheeled shopping trolley to carry groceries" (Henri). Occasionally, they borrowed a car to do bigger purchases. All the participants told how they started to plan their shopping more carefully, to avoid unnecessary trips. Many of them also told how they had reduced excess shopping and recreational shopping, as they did not want to take bus to the city centre just for shopping, or carry extra stuff when travelling by bus.

Changes in mobility practices also reflected other practices of parenting, for instance. In families with children, using buses would have required matching bus, day-care, school and work schedules, and parents could not always fit in the bus with pushchairs. The responsibility for taking children to day-care thus shifted to the parent with a car – and as the not-driving parent often had to leave earlier to work, also much of the other morning routines fell to the car-driving parent. In other words, the practice of day-care travel did not change; it just became mainly the car-driving parent's responsibility. This parent had to start combining trips more consciously: Kati's husband, for instance, drove home from work, picked up the children from day-care on his way, took the older children to their hobbies, did the grocery shopping nearby, picked up the children from hobbies, and drove home. He told how scheduling rides was demanding and one of the parents had to "spend the whole evening in the car, taking kids to different parts of the city".

For the last group of participants, the *changes required were too hard*, and these participants started to regret their participation soon after the beginning of the experiment. Ida did not have anyone to borrow a car from when needed, or anyone to shift some of the tasks to, as other families did. She took her younger child to day-care by bus and continued after that to work by another bus. The "initial charm" of the experiment soon wore off: "When I dragged a fractious child, a pair of skis and two

large bags into a bus, I really, really missed my car." In addition to the extra time needed for daily trips, Ida had to carefully prepare everything for the next day in the evening before, so the departure with tired children would be easier and they did not miss the bus. When it comes to these participants, the experiment thus failed, as bus use proved to be too difficult to combine with other daily practices.

Leisure time activities and visiting friends were the practices that changed the most, as they were not as compulsory as going to work or school. Unlike many work places, friends' and relatives' homes were not always located along bus routes and visits were thus challenging especially for families and elderly participants. Consequently, participants reduced these trips the most during the experiment, causing occasional feelings of social exclusion from familiar interactions.

Within the last category are also those participants who *did not "bother" learning* how to use buses, but replaced driving with other means or by more efficient use of the remaining car. These were mainly elderly participants who did not have as many scheduled daily activities, and who could live more 'slowly'. Also participants such as Kati, for whom the de-routinisation opened up an opportunity to allocate time in a new way between practices, and to re-engage in old practices. For her, work trips became a chance to exercise daily, and in this way, spend more time on other things after work: "I sometimes run to work. -- I have not walked or cycled for a while because there have been two cars parked outside, even though I have always thought positively about exercise". Still having a car available made it unnecessary to change some long-time routines that were done by the remaining car. An example is the combined shopping and lunch trip to the hypermarket every Saturday of Laura and her husband; an efficient way to fulfil the weekly shopping needs. Also, holiday trips and other non-spontaneous trips, such as visiting summer houses, did not change but were made either with the car that remained in the family, or agreeing on borrowing a car well in advance, as Henri had done.

5 Discussion

5.1 Giving up cars as an experiment

The results indicate that the de-routinisation is more probable if there are grounds for experimenting: selecting participants already interested in car-free living made these participants take the final step and give up ownership of their cars. The timing and targeting of the experiment was thus important.

Relocation to a new city has been perceived as a fruitful point of intervention also in previous studies (Thøgersen, 2012), and in this study also relocation within the city, as well as unemployment and retirement, were efficient points for de-routinisation. Changes do not happen from one day to another, but preparations often start a considerable time before the change itself. For instance, the acquisition of prior information about a new neighbourhood or bus routes before moving house, or knowledge on how to use buses with a pushchair for parents-to-be, may be vital for creating the grounds for change. These issues could be better acknowledged in future experiments by, for instance, extending the target groups to cover people under these 'life transitions'.

Handing out free travel cards valid for a couple of weeks has been a successful way of making people aware of the benefits of PT (c.f., Thøgersen and Møller, 2008). The effects often remain temporary, however, and do not show decreases in car use (Fujii and Kitamura, 2003); if you own a car, it is economical to use it (Nygrén et al., 2012). In this case, combining the requirement of giving up car ownership with a financial incentive that lasts long enough was effective. Giving up a car was a forceful moment of disruption, and the threshold of getting back to old habits grew quite high during the experiment, as only one participant bought a new car afterwards due to another 'life transition'. This result confirms previous conclusions of Thøgersen (2009): given that price promotions are virtually free of charge for PT operators (as long as they have unused capacity), promotions are often worth the effort. However, many participants did not continue regular bus use despite the opportunity to test the service for free, indicating that the price of PT is considered too high with respect to the inadequate service provided.

Focusing mainly on two-car households proved valuable, as participants could both 'have the cake and eat it'. Most of them still had another car in the household, or they could borrow one, but they still got the opportunity to experiment with bus use. The experiment forced the participants to adjust their everyday living on the prerequisite of not having a car available all the time, which made them also estimate the need for driving in the first place. Consequently, as the results show, the kilometres driven reduced significantly. From the viewpoint of the City, the experiment was not as effective in encouraging bus use as it could have been if it would have focused on one-car households. The spill-over effect in which bus use would have spread from one family member to another, was not observed. On the contrary, the family-members using buses were quite detached from the mobility practices of others. However, the experiment was a means to tackle the culture of each adult family member owning a car.

5.2 Giving up cars: changing practices

Using buses was mainly restricted to commuting and trips to the city centre or other easily accessible locations, and participants using buses for these trips considered it easy and comfortable. Within other practices, such as day-care or leisure travel, these standards were not met, but participants reduced their mobility by omitting visits to their friends and relatives. Meanings and standards related to everyday mobility were not met by resorting to a bus, but a car was seen as a necessary element for effectively taking care of children and maintaining social activity (c.f., Skarin et al., 2017). Being mobile is thus not only about using different modalities between locations, but is also connected to many other practices, forming the "cement" that holds the network of practices together" (Nijhuis, 2013: 219).

The experiment faced similar limitations to previous price promotions (c.f., Thøgersen, 2009), by assuming that structural conditions (e.g., bus routes, frequencies) do not significantly limit the use of PT. However, these elements define the performances of mobility practices to a high degree, especially in areas such as Jyväskylä that are not among the largest city areas in Finland, and thus have not enough resources for PT that works ideally and attracts people to switch from private driving to bus use. Before price promotions or other soft measures can be considered effective, it is important to promote sustainable mobility also at the national and global level, to support local initiatives and change the cultural and economic landscape (Sheller, 2012). Additionally, one of the targets must be to reduce the need for travel in the first place, as mobility now ties many everyday practices together.

In addition to structural limitations, temporal demands of bus use differ from those of driving, as they require more coordination with other practices. The way participants perceived these temporal demands varied, reflecting their experiences of bus use. For some, the loss of independence of driving was not as devastating, as sitting on a bus could be combined with practices with fewer temporal demands (Southerton, 2013), such as reading and replying to e-mails. Others, however, could not incorporate bus use into their everyday living. They would rather modify the timing of practices to allow driving to grocery shops and leisure time activities – sticking to the familiar way of doing things – than to acquire the new practice of bus use. Although participants learned to allocate their time differently within the premise of not having a car, to combine trips and use buses when necessary, they continued carrying much of their everyday routines as previously.

The more members in a household, the more divergent demands exist. For families, the re-routinisation in mobility required additional work in temporally and spatially coordinating child-care, work, and other practices. In the organisation of everyday living, a car provides the 'easiest way' to manage the day (c.f., Jensen et al., 2015; Kent, 2015). Unlike previous studies, in which the car has been 'a place for me-time' and to 'zone out' (Kent, 2015: 741), in this study the not-driving adults enjoyed me-time in buses or when walking or running to work, while their partners were responsible for running errands, forcing them to spend much of their daily time in a car. Families could benefit from additional support and information on complementary travel modes, such as car sharing and car-pooling. By learning to be 'multi-modal', the disadvantages of travelling by bus compared to by car could be tolerated better (c.f., Nijhuis 2013: 65). Home-delivery of groceries and other services reducing the need to move might also help families to meet the demands of everyday living (c.f., Laakso and Lettenmeier, 2016).

Feelings and emotions – from the joy of learning to regret, embarrassment and fear of failure – were important in the process of re-routinisation. For some, the freedom from car maintenance was liberating, and the positive experiences of gaining new competences and learning how to use buses as a new means of being mobile, as well as shopping without a car and finding new time slots for exercising, strengthened the feeling of having made the right choice. For others, not owning a car meant being dependent on others' help, having to bother their friends and neighbours, and stressful rescheduling of daily tasks. For them, the memory of the car was related to ease, comfort, privacy, and what it means in modern life to look after oneself and one's family (c.f., Kent, 2015; Sheller and Urry, 2000), fortifying, in turn, the negative experiences related to the experiment. PT became a 'necessary evil' in managing daily obligations, or they ended up walking, cycling, or staying home instead. These positive or negative feelings were important in the process of re-routinisation in mobility.

6 Conclusions

This article describes the process that many households will have to go through in the face of climate change – the process of giving up a car – and its consequences for the organisation of everyday life. The success of 'Give up your car' experiment was analysed from two perspectives. Firstly, from the perspective of environmental sustainability, by analysing the reductions in GHG emissions of

participants' everyday mobility. Secondly, from the perspective of the de- and re-routinisation resulting from the experiment, by using the practice theoretical approach.

From the perspective of environmental sustainability, the experiment was successful: the GHG emissions of mobility were reduced due to reduced car use. As the results show, however, the success of the experiment in terms of re-routinisation was not straightforward, as the new routine of bus use was not established by all participants. On the other hand, the experiment successfully made people experiment with alternative ways of being mobile, acquire new skills and competences, as well as embrace new meanings. In this respect, the experiment might be regarded as successful: only one new car was bought afterwards, and participants started walking and cycling more. Although the study focuses on one experimental case, the method enabled examination of the complex interactions of shared practices that became visible due to the experiment, and thus more in-depth understanding on the outcomes of the experiment.

Understanding the dynamics of practices related to mobility is necessary to up-scale the outcomes of the experiment and to accelerate the shift away from private driving. It is important to learn from the experiments, and especially from the experiences of 'failure', to meet the different needs of performing practices. The City of Jyväskylä has continued experimenting, for example, by providing free trial periods for those moving to the city, as well as developing the routes and communication as per feedback from bus users. As the results show, it would also be important in terms of up-scaling to develop complementary means of being mobile (such as city bicycle network and car-pooling) parallel to bus services, especially in areas such as Jyväskylä, with an inadequate population base for efficient PT. The findings can also encourage experimenting in other small cities in Finland, supporting the transformation towards sustainable mobility.

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Conflicts of Interest

The author declares no conflict of interest.

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